

## REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-9 remain in the application. New claims 10-13 have been added. New claim 10 requires that the pan forms a cavity behind the antenna element. This is shown in FIG. 2 and described in paragraph [0020]. New claim 11 requires that the pan is a structural replacement for a window plug. This is described in paragraph [0039]. New claim 12 includes a radio frequency connector mounted in the pan. This connector is shown as item 61 in FIG. 5 and described in paragraph [0022]. New claim 13 requires that the pan forms a pressure seal over a window opening. This is described in paragraph [0034].

In Section 2 of the Detailed Action portion of the Office Action, claims 1-9 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Alt et al. (U.S. Patent No. 6,198,445 B1) in view of Sanz et al. (U.S. Patent Publication No. 2004/0262453 A1).

As per claim 1, Alt et al. was cited as teaching "a conformal load-bearing antenna assembly" comprising: a pan shaped to fit within an aircraft window opening (Alt et al., column 2, lines 14-26); an antenna element disposed within the pan (Alt et al., figure 1, radiating element 14; column 3, line 62-column 4, line 24); and a connection for coupling a signal to the antenna element (Alt et al., column 4, lines 2-24).

The Office Action notes that Alt et al. does not disclose a pan providing structural rigidity. However, Sanz et al. was cited as teaching that such a pan providing structural rigidity is widely used in the art (Sanz et al., paragraph [0021]). According to the Office Action, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide Alt et al.'s antenna system with a pan providing structural rigidity, as taught by Sanz et al. in order to have a good antenna structure.

The Applicants traverse this rejection and respectfully submit that the Office Action has failed to establish a prima facie case of obviousness. To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to

combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Office Action fails to meet all three of these criteria. Taking the criteria in reverse order, the Applicants respectfully submit that the references do not teach or suggest all the claim limitations. In particular, with respect to claim 1, the references do not teach a conformal load-bearing antenna assembly that includes (among other things) a pan providing structural rigidity and shaped to fit within an aircraft window opening. The Office Action cites Alt et al., column 2, lines 14-26 as showing a pan shaped to fit within an aircraft window opening. However, the Applicants respectfully submit that Alt et al. does not disclose a pan shaped to fit within an aircraft window opening.

Alt et al. discloses a conformal load bearing antenna structure that is designed to be mounted on the outer skin of an aircraft (column 2, line 14). A review of Alt et al. reveals that Alt et al. does not even contain the word "window". Thus, there is no teaching or suggestion in Alt et al. that the pan can be shaped to fit within an aircraft window opening.

The Office Action further states that Sanz et al. teaches that a pan providing structural rigidity is widely used in the art (Sanz et al., paragraph [0021]). However, the Applicants respectfully submit that Sanz et al. does not disclose a pan, nor does Sanz et al. teach that any feature of his device is widely used in the art. Paragraph [0021] of Sanz et al. discloses a rigid panel (12) that replaces the function of a window frame (Sanz et al., paragraph [0021]). The rigid panel (12) of Sanz et al. is not a pan, and it does not serve the same function as the pan of the Applicants' invention.

The pan of the Applicants' invention serves several functions listed in paragraph [0034] of the present application, including: as a housing for the antenna element, as a mount for the RF connector to the transmitter/receiver coaxial cable, and as a pressure seal over the fuselage window opening. The pan of the Applicants' claim 1

also serves as a pressure plug to seal the window opening. The panel of Sanz et al. replaces a window frame. It does not seal the window opening. Furthermore, it has a large central opening and therefore cannot serve as a pressure plug.

Under the second criteria for establishment of a *prima facie* case of obviousness, there must be a reasonable expectation of success. However, there is nothing in the teachings of Alt et al. and Sanz et al. to indicate that an antenna assembly that can successfully replace a window plug would result from a combination of their teachings. More specifically, there is nothing in Sanz et al. to indicate that their panel (12) could serve as a pressure plug in an antenna assembly that is substituted for a window plug.

Furthermore, it is apparent that the antenna structure of Alt et al. is designed to be attached to an outer skin of an aircraft. In contrast, the present invention is designed to be installed in a window opening. Since the present invention and the antenna of Alt et al. are designed to be placed in different locations on an aircraft, the two antenna assemblies must be designed to withstand different structural loads. In particular, the antenna assembly of the present invention is designed to withstand the structural loads previously withheld by a window, while the assembly of Alt et al. must withstand different structural loads. The pan of the present invention provides the required rigidity for an antenna structure that fits within a window opening. Alt et al. neither discloses nor suggests that the pan can provide the necessary structural rigidity, and in fact, Alt et al. specifically teaches away from using the pan to provide structural rigidity. The panel of Sanz et al. does not cover the window opening and therefore does not perform the same function as the pan of the Applicants' claim 1.

Finally, to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. The Court of Appeals for the Federal Circuit has repeatedly held that a "teaching or suggestion or motivation" to combine prior art references is an "essential evidentiary component" of any obviousness holding.

The Office Action states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide Alt et al.'s antenna system with a pan providing structural rigidity, as taught by Sanz et al. in order to have a good antenna structure. The Applicants respectfully submit that there is nothing in the references that suggests that such a combination would produce a good antenna structure.

The Applicants further respectfully submit that the Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

In the antenna structure of Alt et al., "the top face sheet, the dielectric, the structural core, and the bottom face sheet are configured to provide structural strength to the aircraft when the antenna is attached to the outer skin thereof", (see the abstract and col. 7, lines 10-13). Alt et al. states in column 6, at lines 2-4, that "...the absorber pan 26 is not constructed to provide any structural strength and/or rigidity to the antenna structure 10", (emphasis added). Thus, Alt et al. teaches away from the invention of amended claim 1. Alt et al. neither discloses nor suggests the use or desirability of a pan for providing structural rigidity. Therefore, the inclusion of a structurally rigid pan in the structure of Alt et al. would be contrary to the teachings of Alt et al.

In addition, the combination of the pan and the antenna element in the Applicants' claim 1 forms a cavity backed antenna. Since the panel of Sanz et al. has a large central opening, it cannot form the cavity used in a cavity backed antenna.

The Examiner has failed to show reasons that the skilled artisan, confronted with the same problems as the inventors and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. It is only in hindsight in view of the Applicants' teachings that one skilled in the art would recognize that the combination of features in claim 1 would provide an antenna assembly that can serve as a substitute for a window plug.

Regarding claim 2, Alt et al., column 3, lines 41-60, column 4, lines 34-58 was cited as showing an antenna element comprising a stripline supported by a dielectric sheet, and at least one radiating element couple to stripline.

Since claim 2 depends from claim 1, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claim 1, and for the following reason. The radiating element 14 of Alt et al. is described as “a single ply of metalized polymeric material etched into four spiral patterns 15.” (Column 3, lines 63-65). The radiating element 14 of Alt et al. is therefore not a stripline, as is required by claim 2.

Regarding claim 3, Alt et al., column 3, lines 41-60 was cited as showing an antenna element further comprising a front ground plane and a back ground plane, with the front ground forming with one or more slots adjacent to the radiating element.

Since claim 3 depends from claims 1 and 2, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claim 1, and for the following reason. The Applicants respectfully submit that Alt et al. neither discloses nor suggests the use of front and back ground planes, with the front ground forming with one or more slots adjacent to the radiating element. Ground planes, by definition, must be electrically conductive. In Alt et al. the top and bottom face sheets 12 and 22 respectively, are made of non-conducting materials, such as fiberglass and epoxy, col. 3, lines 55-60 and col. 5, lines 22-25. The Applicants respectfully submit that column 3, lines 41-60, of Alt et al., cited in the Office Action, says nothing about a front and back ground plane as required in claim 3.

Regarding claim 4, Alt, column 4, line 59-column 5, line 37 was cited as showing a conductive gasket positioned adjacent to the perimeter of the antenna element, electrically bonding the antenna to an aircraft fuselage and providing a pressure seal.

Since claim 4 depends from claim 1, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claim 1, and for the following reason. The Applicants respectfully submit that Alt et al. neither discloses nor suggests the use of a conductive gasket positioned adjacent to the perimeter of the antenna element, electrically bonding the antenna to an aircraft fuselage and providing a

pressure seal. In particular, the Applicants respectfully submit that column 4, line 59 to column 5, line 37, as cited in the Office Action, neither discloses nor suggests the use of a conductive gasket positioned adjacent to the perimeter of the antenna element, electrically bonding the antenna to an aircraft fuselage and providing a pressure seal. The only bonding mentioned in column 4, line 59 to column 5, line 37 of Alt et al. is “an appropriate non-conducting adhesive.” A non-conducting adhesive would not provide the electrical bonding required in claim 4 of the present invention.

Regarding claim 5, Alt et al., column 6, lines 5-34 was cited as showing a pan forming a pressure seal with the aircraft window opening.

Since claim 5 depends from claim 1, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claim 1, and for the following reasons. The Applicants respectfully submit that Alt et al. neither discloses nor suggests an antenna assembly that fits in a window opening. Thus Alt et al. neither discloses nor suggests the use of a pan to form a pressure seal with the aircraft window opening. Column 6, lines 5-34 of Alt et al., cited in the Office Action, do not show such a structure and do not say anything about a pressure seal.

Regarding claim 6, Alt et al., column 6, lines 5-53 was cited as showing a bonding strap for carrying lightning currents from the antenna structure to a fuselage of the aircraft.

Since claim 6 depends from claim 1, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claim 1, and for the following reasons. The Applicants respectfully submit that Alt et al. neither discloses nor suggests a bonding strap for carrying lightning currents from the antenna structure to a fuselage of the aircraft. In particular, column 6, lines 5-53, cited in the Office Action, do not show a bonding strap for carrying lightning currents from the antenna structure to a fuselage of the aircraft.

Regarding claim 7, Alt et al., figure 1, column 3, lines 41-60 was cited as showing the front ground plane and the back ground plane are electrically bonded to each other.

Since claim 7 depends from claims 1, 2 and 3, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claims 1, 2 and 3, and for the following reasons. The Applicants respectfully submit that Alt et al. neither discloses nor suggests the use of front and back ground planes, with the front ground forming one or more slots adjacent to the radiating element. Ground planes, by definition, must be electrically conductive. In Alt et al. the top and bottom face sheets 12 and 22 respectively, are made of non-conducting materials, such as fiberglass and epoxy, col. 3, lines 55-60 and col. 5, lines 22-25. The Applicants respectfully submit that Alt et al., says nothing about electrically bonded front and back ground planes as required in claim 7.

Regarding claim 8, Alt et al., figure 1, column 5, line 57-column 6, line 4 was cited as showing the back ground plane is electrically bonded to the pan.

Since claim 8 depends from claims 1, 2 and 3, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claims 1, 2 and 3, and for the following reasons. The Applicants respectfully submit that Alt et al. neither discloses nor suggests the use of a back ground plane bonded to the pan. The Applicants respectfully submit that Alt et al., says nothing about a back ground plane bonded to the pan as required in claim 8.

Regarding claim 9, Alt et al., figure 1, was cited as showing stripline 30 wherein the antenna element comprised a tapered stripline.

Since claim 9 depends from claim 1, this rejection is traversed for the reasons set forth above with respect to the traversal of the rejection of claim 1, and for the following reasons. The Applicants respectfully submit that Alt et al. neither discloses nor suggests a tapered stripline. A tapered stripline, such as item 92 in FIG. 9 of the present application, becomes progressively smaller toward one end. The transmission strip 30, in figure 1 of Alt et al., cited in the Office Action, is not a tapered structure since it does not appear to become progressively smaller toward one end.

The new claims contain additional features. New claim 10 requires that the pan forms a cavity behind the antenna element. New claim 11 requires that the pan is a structural replacement for a window plug. New claim 12 includes a radio frequency

connector mounted in the pan. New claim 13 requires that the pan forms a pressure seal over a window opening.

All claims in the application are believed to be in allowable form.  
Allowance of the application is requested.

Respectfully submitted,

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